## WHAT IS CLAIMED IS:

A medical device comprising a composite having an inorganic substrate and a polymer covering at least a portion of the substrate, the polymer forming a structure substantially different from the structure of the substrate.

- 2. The medical device of claim 1 wherein the inorganic substrate comprises metal.
- 3. The medical device of claim 1 wherein the inorganic substrate comprises a ceramic.
- 4. The medical device of claim 1 wherein the polymer/inorganic substrate composite can be bent at least about 100 degrees.
- The medical device of claim 1 wherein the polymer is selected from the group consisting of polyetheretherketones, polyacetals, polyamides, polypropylenes, polyurethanes, polytetrafluoroethylenes, polyester teraphthalates, polycarbonates, polysulfones.
- 6. The medical device of claim 1 wherein the polymer has an average thickness of at least about 10 microns.
- 7. The medical device of claim 1 wherein the polymer has an average thickness from about 100 microns to about 2000 microns.
- 8. The medical device of claim 1 wherein the medical device comprises a heart valve prosthesis, the heart valve prosthesis comprising a component that comprises the composite having the inorganic substrate and the polymer material.
- 9. The medical device of claim 1 wherein the polymer material forms a slot, hole, pin, button, barb or anchor.
- 10. A medical device comprising a flexible composite component comprising an inorganic substrate

5 Nr 2

51/23

and a polymer member covering at least over a portion of the substrate, wherein the composite can be bent, at least, about 100 degrees without extending the material beyond its elastic limit.

- 11. The medical device of claim 10 wherein the inorganic substrate comprises a metal foil with a thickness less than about 500 microns.
- 12. The medical device of claim 10 wherein the polymer is selected from the group consisting of polyurethanes, polydimethylsiloxanes and polytetrafluoro ethylenes.
- 13. The medical device of claim 10 wherein the polymer member has a thickness from about 10 microns to about 500 microns.
- 14. The medical device of claim 10 wherein the polymer member has a thickness from about 50 microns to about 300 microns.

The medical device of claim 10 wherein the medical device comprises a heart valve prosthesis and the composite component comprising leaflets.

The medical device of claim 10 wherein the composite can be bent about 180 degrees without extending the material beyond its elastic limit.

17. The medical device of claim 10 wherein the composite can be bent about 180 degrees with a radius of curvature about the thickness of the composite without extending the material beyond its elastic limit.

18. The medical device of claim 10 wherein the composite can be bent about 60 degrees for about 40 million cycles without significant structural failure.

19. The medical device of claim 10 wherein the composite can be bent about 60 degrees for about 400 pullion cycles without significant structural failure.

5 wh B

5 N B 5



- 20. The medical device of claim 10 wherein the composite further comprises a diamond-like carbon coating over at least a portion of the polymer.
- A method of forming a medical device, the method comprising applying a polymer on an inorganic substrate to form a composite, wherein the polymer is applied such that the polymer does not conform to the shape of the substrate.
- 22. The method of claim 21 wherein the process for the application of the polymer comprises a molding process.
- 23. The method/of claim 21 wherein the process for the application of the polymer comprises an injection molding process.
- 24. The method of claim 21 wherein the process for the application of the polymer comprises a casting process.
- 25. The method of claim 21 wherein the process for the application of the polymer comprises an extrusion process.
- 26. The method of claim 21 wherein the composite can be bent at least about 100 degrees.
- 27. The method of claim 21 further comprising crosslinking the polymer.
- 28. The method of claim 21 further comprising applying a diamond-like carbon coating onto the substrate.
- 29. The method of claim 21 wherein the medical device comprises a heart valve prosthesis.
- 30. The method of claim 21 wherein the polymer has a thickness greater than about 10 microns.

Add B

F2